

Risk analyses for mechanical failures in railway transports



Derailment in Ludvika (photo: TT)

Background

Railway transports are in general some 50–100 times safer than car transports. To sustain this high level of safety, there are demands for risk analyses to ensure the safety of new solutions. Commonly, this is expressed as a requirement to show that the new solution is “equally safe, or safer than the existing solutions”. This is a challenge, not the least, since the current safety level is usually not known. On top of that, the safety levels are often so high that also very uncommon events need to be accounted for.

Objectives and aim

The objective of the project is to investigate suitable approaches for risk analyses related to mechanical failures. In particular, the focus is on methods where the risks are quantified using simulations and/or operational data (in contrast to e.g. methods based on “expert estimations”). The approach(es) are intended to be demonstrated on simple operational cases with the aim to achieve a more general recommendation on how to improve risk analyses in the field.

Approach

- Overview of methods for risk analyses
- Specific challenges in the railway sector
- Identification of test cases and candidate approaches for these
- Identification of prioritised areas of the risk analysis for the current study
- Detailed analyses of the selected scenarios
- Outline of recommendations for risk analysis for the studied cases and in general

Prerequisites: Solid mechanics, statistics, fatigue and fracture
Supervisor: Professor Anders Ekberg, anders.ekberg@chalmers.se, 031 772 3480
Examiner: Professor Elena Kabo, elena.kabo@chalmers.se, 031 772 1302